WHS-7917

# DIAGNOSTIC POLYMERASE CHAIN REACTION PROCESS UTILIZING SIMULTANEOUS CAPTURE AND DETECTION OF AMPLICONS

## CROSS REFERENCE TO RELATED APPLICATIONS:

This application claims the benefit of U.S. Provisional Application No. 60/238,792, filed October 6, 2000.

## BACKGROUND OF THE INVENTION:

### FIELD OF THE INVENTION:

The invention relates to qualitatively and quantitatively detecting the presence of genomic material.

The replication of genomic material (RNA and DNA) is well known and is discussed in numerous patents such as U.S. Patent Nos. 4,582,789 and 4,683,202.

## SUMMARY OF THE INVENTION:

It is an object of the invention to provide a diagnostic polymerase chain reaction utilizing simultaneous capture and detection of amplicons that overcomes the disadvantages of the heretofore-known devices and methods of this general type.

With the foregoing and other objects in view there is provided, in accordance with the invention, a method for simultaneously detecting and capturing a double-stranded DNA sequence. The method includes the following steps. The first step is providing a sample. The next step is adding a forward primer for the double-stranded DNA sequence and a reverse primer for the double-stranded DNA sequence. Either the forward primer or the reverse primer have a capture agent; the other has a detection agent. The next step is replicating the double-stranded DNA sequence. The next step is binding the capture agent to a capture medium. The next step is rinsing the sample. The next step is detecting the detection agent.

In accordance with a further mode of the invention, the method includes selecting the capture agent from the group consisting of sulfhydryl group, biotin, cellulose binding domain, and a specific nucleotide sequence.

In accordance with a further mode of the invention, the capture agent includes a molecular spacer to prevent the capture agent from affecting the attached primer.

In accordance with a further mode of the invention, the method includes selecting the capture medium from the group consisting of maleamide, avodin, strepavodin, cellulose, and a complementary nucleotide sequence.

In accordance with a further mode of the invention, the method includes selecting a detecting agent from the group consisting of radioactive labels, peptide antigens, and fluorometric dyes. The radioactive label can be Iodine-151.

In accordance with a further mode of the invention, the method includes adding monocolonal antibody specific to the peptide antigen having a detector.

In accordance with a further mode of the invention, the method includes selecting the detector from the group of radioactive labels, direct fluorescent antibodies, radiolabeled antibodies, and fluorometric dyes.

In accordance with a further object of the invention, the detecting agent can include a molecular spacer to prevent the capture agent from affecting the attached primer.

In accordance with a further object of the invention, the method includes detecting a plurality of double-stranded DNA sequence by adding a forward primer and a reverse primer for each additional double-stranded DNA sequence. One of each pair of a forward primers and a reverse primer has a capture agent, and the other of the pair has a second detection agent. In addition, each detection agent is different.